



**CERTIFICATE OF MAILING**

I hereby certify that this APPEAL BRIEF is being deposited with the U.S. Postal Service with sufficient postage as first class mail in an envelope addressed to the Mail Stop Appeal Brief - Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 5<sup>th</sup> day of

March 2004.  
Signed: Carole Guernsey **PATENT**

**AND TRADEMARK OFFICE**

**IN THE UNITED STATES PATENT**

In re application of:	)	Examiner: John T. Haran
Casey et al	)	
	)	
Serial No.: 09/944,284	)	Art Unit: 1733
	)	
Filed: August 31, 2001	)	
	)	Confirmation No. 1893
For: <b>METHOD OF JOINING LAMINATES</b>	)	
<b>FOR Z-AXIS INTERCONNECTION</b>	)	

Attorney Docket No.: FIS920010127US1 (IFI-10-5579)

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

**TRANSMITTAL OF APPEAL BRIEF**

Dear Sir:

1. Transmitted herewith in triplicate is an APPEAL BRIEF in this application with respect to the Notice of Appeal filed on January 8, 2004.

*Note: "The applicant shall, within 2 months from the date of the notice of appeal under § 1.191 in an application, reissue application, or patent under reexamination, or within the time allowed for response to the action appealed from, if such time is later, file a brief in triplicate." 37 CVF 1.192(a) [emphasis added].*

2. **STATUS OF APPLICATION**

This application is on behalf of

other than a small entity

3. **FEE FOR FILING APPEAL BRIEF**

Pursuant to 37 CFR 1.17(f) the fee for filing the Appeal Brief is:

small entity

other than small entity \$ 330.00

**Appeal Brief fee due: \$330.00**

4. **EXTENSION OF TERM**

*Note: The time periods set forth in 37 CFR 1.192(a) are subject to the provision of § 1.136 for patent application. 37 CFR 1.191(d). Also see Notice of November 5, 1985 (1060 O.G. 27).*

The proceedings herein are for a patent application and the provisions of 27 CFR 1.136 apply.

(complete (a) or (b) as applicable)

(a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees:

37

CFR 1.17(a)-(d)) for the total number of months checked below:

Extension Months	Fee for other than small entity	Fee for small entity
One month	\$110.00	\$55.00
Two months	\$420.00	\$210.00
Three months	\$950.00	\$475.00
Four months	\$1,480.00	\$740.00
<b>Fee:</b>		

If an additional extension of time is required, please consider this a petition therefor.

(check and complete the next item, if applicable)

An extension for \_\_\_\_\_ months has already been secured and the fee paid therefor of \$\_\_\_\_\_ is deducted from the total fee due for the total months of extension now requested.

or

(b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for

Extension fee (if any) \$ 0.00

**TOTAL FEE DUE: \$330.00**

**6. FEE PAYMENT**

Attached is a check in the sum of \$ \_\_\_\_\_

Charge **Account No. 03-0172** in the sum of **\$330.00**. A duplicate of this transmittal is attached.

**7. FEE DEFICIENCY**

**NOTE:** If there is a fee deficiency and there is no authorization to charge an account, additional fees are necessary to cover the additional time consumed in making up the original deficiency. if the maximum, six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in returning the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to charge the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, 1065 O.G. 31-33.

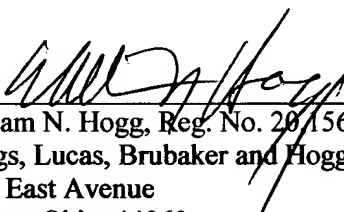
If any additional extension and/or fee is required, this is a request therefor and to charge **Account No. 03-0172**.

AND/OR

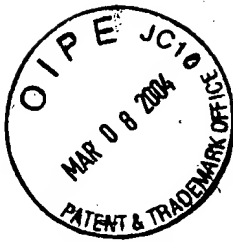
If any additional fee for claims is required, charge **Account No. 03-0172**.

Respectfully submitted,

Date: 3-5-2004

  
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WNH:cg  
Attachments



**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: ) Examiner: John T. Haran  
Casey et al )  
)  
Serial No.: 09/944,284 ) Art Unit: 1733  
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) Confirmation No. 1893  
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**FOR Z-AXIS INTERCONNECTION** )

Attorney Docket No.: FIS920010127US1 (IFI-10-5579)

**APPEAL BRIEF**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

**I. REAL PARTY IN INTEREST**

The real party in interest in the above-entitled application is International Business  
Machines Corporation of Armonk, New York.

**II. RELATED APPEALS AND INTERFERENCES**

The undersigned attorney is not aware of any related appeals or interferences which would  
directly affect, or be directly affected by, or have a bearing on the Board's decision in this pending

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FIS920010127US1 (IFI-10-5579)

### **III. STATUS OF THE CLAIMS**

Claims 1-9, all of the claims originally in the application, some of which have been amended, have been rejected. No claim has been allowed.

### **IV. STATUS OF AMENDMENTS**

No amendments were filed after final rejection.

### **V. SUMMARY OF THE INVENTION**

According to the present invention, a method of forming a laminated composite printed wiring structure of a plurality of at least three superimposed subcomposites is provided. The method includes providing a plurality of organic, dielectric subcomposite structures 10 (page 6, lines 1-15, Figure 1 showing a plated hole; also see Figure 2 which shows an unplated hole), each having opposed faces 16, 18 and a plurality of through via openings 22 therein extending between the faces. The via openings in the subcomposite structures are positioned to align with openings 16, 18 in at least one adjacent subcomposite structure that is to be joined thereto (Figure 12). Printed wiring 20, 21 is provided on at least one face of one subcomposite structure and at least one power plane 12 is also provided in at least one subcomposite structure. Each via opening is filled with a conductive paste material 42 that can be subsequently hardened or cured with the conductive paste material extending beyond at least one face of one subcomposite structure (Figures 5-7; page 7, line 9; page 10, line 7). A plurality of aligned index openings 24 are provided in each subcomposite structure which will cooperate with fixture pins to align the filled via holes of the various subcomposite substructures where required when in superimposed relationship. The index openings also cooperate with pins 39 to align the subcomposites for

filling through screens, stencils, or masks 40 (Figure 4). The via holes in the subcomposites are filled, with the subcomposites each being held in a fixture 38 with a mask 40 also being held in the fixture 38. An adhesive 44 (Figures 4 and 7) is provided between adjacent subcomposite structures 10, the adhesive having openings 46 for the conductive paste 42. The conductive paste is less than the fully cured (page 8, lines 10-14) so that the paste in adjacent layers can bond together when fully cured. The subcomposite structures are laid up with the adhesive material 44 disposed therebetween in superposed relationship on a fixture including elements 52 extending through said index openings to align the subcomposite structure with the conductive paste and adjacent openings in the subcomposite structures in contact with each other. The conductive paste is then cured fully and the laminate wiring structure is formed from the superimposed subcomposite structures (page 9, lines 12-19). In one embodiment, the subcomposite structures are fully circuitized before being laid up and formed into a composite laminate (Figures 1-7), using conventional circuitizing techniques and, in another embodiment, conductive paste is utilized on at least some faces of the subcomposite structures to provide the circuitization prior to being laid up in a laminate structure (Figures 8-13).

## **VI. ISSUES**

Are claims 1-9, or any one of them, unpatentable under 35 USC § 103.

## **VII. GROUPING OF THE CLAIMS**

Claims 1 and 4 stand or fall together, and claim 1 is representative

Claim 2 stands or falls alone.

Claims 3 and 5 stand or fall together, and claim 3 is representative

Claim 6 stands or falls alone.

Claims 7-9 stand or fall together, and claim 7 is representative.

## **VIII. ARGUMENTS**

Claims 1-9 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Bross et al, U.S. Patent 5,517,751, hereinafter Bross et al, in view of Kawakita et al, U.S. Patent 5,817,404, hereinafter Kawakita et al, and Pommer, U.S. Patent 6,560,844, hereinafter Pommer. This rejection is not thought to be well taken.

Claim 1, a method claim, is the only independent claim in the application, and it is not believed that any reasonable combination of Bross et al, Kawakita et al and Pommer teaches or suggests the method steps of claim 1.

Claim 1 is directed to a method of forming a laminated composite structure from at least three subcomposite structures. A plurality of at least three subcomposite structures, each having a plurality of via openings therein, is provided. Each via opening is positioned to align with a via opening in at least one other subcomposite structure. Each via opening is filled with a conductive paste material that can be hardened or cured with a conductive paste extending from another opening. A plurality of aligned index openings is provided in each subcomposite structure for via opening alignment. An adhesive is provided between subcomposite structures to join them together. The subcomposite structures are laid up on a fixture having elements extending through the index holes for via opening alignment. The conductive paste is then fully cured to form a composite structure.

First, and as noted by the examiner, Bross et al do not teach or suggest the use of curable conductive paste. Rather, Bross et al teach the use of solid conductive material either inserted into, or molded into, the via openings (column 3, lines 1-23). Thus, there is no suggestion of the use of conductive paste, which is later cured to form the composite structure. The only two techniques disclosed by Bross et al are compression bonding of the metal inserts, and the use of low melting

solder at the tips of the inserts. Both of these have their problems. With the compression techniques, when there are a significant number of vias, the inserts will tend to bend and not bond properly under the high force necessary. The problem of melting additional material for bonding contributes to poorly formed bonds and the possibility of shorting. In applicants' application, the plastic nature of the paste allows it to deform and form good bonds. In any event, Bross et al do not teach the use of a curable conductive adhesive. Moreover, Bross et al are silent as to how the various components are aligned for joining, and joining by curing the paste. It is also to be noted that some of the filled vias of Bross et al do not align with filled vias in any other subcomposite structures.

While it is true that Kawakita et al show the use of conductive paste, it is in an entirely different context, and would not suggest to one skilled in the art that it could be used in Bross et al to connect the vias. In Kawakita et al, the conductive paste is used in a totally different way and for a different purpose. In this patent, the conductive paste is used to connect the circuitry on one side of a board to the circuitry on the other side of the board. In all cases, the paste is capped with a portion of the circuitry on both sides of the board. Thus, the paste is not available to interconnect two boards by bonding of the paste in the vias. Indeed, there is nothing to indicate that the paste is partially cured in order to interconnect with other paste. The examiner, in the final rejection, states "One skilled in the art would have readily appreciated that the vias must be filled with a conductive material and that metal and curable conductive paste are alternate expedients that are obvious over one another." However, it is submitted that this misses the point. While it is true that both conduct electricity, there is no suggestion in any reference that conductive paste can be used in Bross et al to replace the solder connections. This is taught only by applicants.

While it is true that Pommer shows posts for alignment of various components, it is not for the purpose of aligning filled vias for final cure.

The test for obviousness is clear. In rejecting claims under 35 U.S.C. §103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1986). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). Anticipation requires identity of the claimed process and a process of the prior art; the claimed process, including each step thereof, must have been described or embodied, either expressly or inherently, in a single reference” Glaverbel Societe Anonyme v. Northlake Marketing & Supply, Inc. 45 F. 3d 1550, 1554, 33 USPQ2d 1496, 1498 (Fed. Cir. 1995). A possibility or probability that features of the prior art contained in the disclosure of the prior art is not enough to establish anticipation. The same characteristics must be a “natural result flowing” from what is disclosed. (Continental Can Co. v. Monsanto Co., 20 USPQ2d 1746, 1749 (Fed Cir.

1991).

In this case, there is no teaching or suggestion, reason or motivation for combining the references and, even if one were to do so, the resulting method claimed in claim 1 would not be achieved. As pointed out above, there is no teaching in any reference that conductive paste could be used to connect one via to another, and certainly not of filling the vias, and then aligning them and then curing the paste. The only use of paste, as disclosed in Kawakita et al, is connecting the circuitry on one side of a board to the circuitry on the other side, not connecting one via to another. Moreover, there is nothing in any reference to suggest the use of an adhesive between laminates. Additionally, there is nothing to suggest registering the structures using registration openings to align the vias for lamination

Claims 2-9 depend from claim 1 and, for the same reasons, are believed to be allowable. In addition, claim 2 requires that the adhesive material be in the form of a separate sheet of material. This is not taught nor suggested by any of the references. For this additional reason, it is believed that claim 2 is allowable.

Claims 3 and 5 require that at least some of the via openings have plated surfaces. This is not taught nor suggested by either Bross et al or Kawakita et al. Thus, claims 3 and 5, for this additional reason, are believed to be allowable.

Claim 6 requires the paste be partially cured before lamination. This is not taught nor suggested by Kawakita et al. For this additional reason, it is believed that claim 6 is allowable.

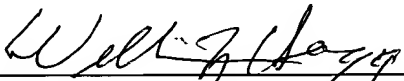
Claims 7-9 require that a mask be used with the conductive paste. This is not taught nor suggested by Kawakita et al. (see column 7, lines 10-12). For this additional reason, it is believed that claims 7-9 are allowable.

## SUMMARY

In view of the above, it is believed that all of the claims herein on appeal are allowable, and it is respectfully requested that the Board reverse the examiner's rejection, and allow all of the claims.

Respectfully submitted,

Date: 3-5-2004

  
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## APPENDIX

1. A method of forming a laminated composite printed wiring structure of a plurality of at least three superimposed subcomposites comprising the steps of:

providing a plurality of at least three organic dielectric subcomposite structures, each having a plurality of through via openings therein extending between said faces, and wherein the via openings in each subcomposite structure are positioned to align with a via opening in at least one subcomposite structure that is to be adjacent said each subcomposite structure, and printed wiring on at least one face of one subcomposite structure,

filling each via opening with a conductive paste material that can be hardened or cured with said conductive paste material extending beyond at least one face of the subcomposite structure,

providing a plurality of aligned index openings in each subcomposite structure which will cooperate with a fixture to align at least some of said via holes in adjacent subcomponent structures when in superimposed relationship,

providing adhesive for location between adjacent superimposed structures, said adhesive having openings for said conductive paste,

laying up said subcomposite with said adhesive material disposed there between in superimposed relationship on a fixture, including elements extending through said index openings to align said subcomposite structures with conductive paste in adjacent via openings in said subcomposite structures, in contact with each other; and

fully curing said conductive paste in said adjacent superimposed structures to form a laminated composite structure.

2. The invention as defined in claim 1 wherein said adhesive material is in the form of separate adhesive sheets.

3. The invention as defined in claim 1 wherein said via openings have plated conductive surfaces.

4. The invention as defined in claim 1 wherein said via openings are free of plating therein.

5. The invention as defined in claim 1 wherein at least some of said via openings are copper plated.

6. The invention as defined in claim 1 wherein said conductive paste is partially cured or dried before the subcomposites are laminated.

7. The invention as defined in claim 1 wherein said via openings are filled with said conductive paste through a mask.

8. The invention as defined in claim 7 wherein each of said subcomposites are registered with said registration openings and said mask to fill the via openings with the conductive paste.

9. The invention as defined in claim 7 wherein circuitry is applied to at least one side of at least one of said subcomposite through said mask.